WILM - SULFATE LANDFILL

FILE COPY

MACTEC

engineering and constructing a better tomorrow

Mr. David Adams
MassDEP Northeast Region
205B Lowell Street
Wilmington, Massachusetts 01887

December 13, 2006

Dear Mr. Adams:

Subject: Closure Certification Letter
Calcium Sulfate Landfill
51 Eames Street, Wilmington MA

This letter is being submitted by MACTEC Engineering and Consulting on behalf of Olin Corporation to request Closure Certification for the Calcium Sulfate Landfill (CSL). The Calcium Sulfate Landfill, formerly known as the "Olin Gypsum Landfill", is located upon a portion of land owned by Olin Corporation at its 51 Eames Street property, in Wilmington, Massachusetts (Figure 1). The CSL (Figure 2) was operated between 1975 and 1987 for the disposal of approximately 37,000 cubic yards of gypsum from on-site lagoons at the 51 Eames Street manufacturing facility. Gypsum is a calcium sulfate mineral. The Massachusetts Department of Environmental Protection (MADEP) currently lists the "Olin Gypsum Landfill" status as closed as of 1988, but not certified. Olin is providing additional information attached to this letter in support of a final closure certification for the CSL in accordance with the original closure plan. This information includes a brief field report for a cover system inspection completed in October 2006, a recent Site Plan survey, and a copy of the original closure plan drawing.

The CSL location and development plans were approved by the MADEP on January 16, 1974 and by the Town of Wilmington, MA, Board of Health on October 11, 1974. The facility was operated between 1975 and 1987. Olin submitted a "Landfill Closure Conceptual Site Plan", dated October 13, 1986, which was prepared by E.C. Jordan Company. This plan received final approval by MADEP on February 24, 1987. The approved cover system consisted of six inches of low permeability soil and three inches of vegetative soil and was constructed by Olin in late 1987 and notification of completion provided to MADEP in early 1988. A third party inspection of the cap by E.C. Jordan Company indicated that approximately one-third of the topsoil cover was less than the 3-inch thickness required in the approved closure plan. On June 30, 1988, Olin confirmed to MADEP its intention to place additional top soil, to remedy the topsoil thickness concern, on a schedule that was agreeable to both parties. On September 14 and 15, 1988, Olin, under the oversight of E.C. Jordan, corrected the observed deficiencies in the 3-inch thick top soil layer by placing soil over two areas approximately 10,450 square feet and 8,600 square feet respectively.

SEMS Doc ID 653912

MACTEC Engineering and Consulting, Inc.
511 Congress Street, P.O. Box 7050 • Portland, ME 04112-7050 • Phone: 207.775.5401 • Fax: 207.772.4762
www.mactec.com

The closure certification was put on hold at that time to evaluate forthcoming changes in the Solid Waste Regulations. Then on May 28, 1992, the approximate 53 acre Olin Site was listed by MADEP as a Confirmed Disposal Site, MADEP Release Tracking Number (RTN) 3-0471, and was categorically listed by MADEP as a Tier 1A Disposal Site under the transition provisions of the revised Massachusetts Contingency Plan (MCP) in 1993. This designation included the portion of the parcel occupied by the CSL, and no further steps were taken to finalize the closure certification. In April 2006, USEPA placed the Olin Chemical Site-Wilmington, MA on the National Priorities List. In prior and subsequent discussions with MADEP, EPA indicated that the Olin could seek to close the CSL under State regulation since hazardous substances were not disposed there.

Subsequent to discussions with the MADEP in September of 2006, additional field studies have been conducted to confirm that the current thickness of the topsoil-vegetative support layer meets the original approved closure design requirements and that the existing cover system meets the general performance standards currently listed in 310CMR 19.112(1) for landfill final cover systems.

The following attachments are included in support of this request for closure certification.

Attachment A: 2006 Site Plan Survey
Attachment B: 1986 Landfill Closure Conceptual Site Plan, and 1987 Site Plan Survey
Attachment C: 2006 CSL Cover System Inspection Report

The Cover System Inspection Report includes a figure showing the locations where the top soil layer thickness was observed and samples were collected for analysis of total organic matter. The topsoil – vegetative support layer is typically thicker than 7-inches and therefore meets the approved closure plan required thickness of 3-inches. Analytical data included in the Cover System Inspection Report indicates top soil averages 4.3 % total organic matter which is greater than the minimum organic content of 3% required under 310CMR 19.112(9)(b)1. The topsoil-vegetative support layer as installed supports a healthy, vegetative cover consisting of a mix of fescue, and white clover. This vegetative cover meets the performance standards of 310CMR 19.112(10)(a) by providing a complete and self propagating cover over the landfill which minimizes erosion of underlying material, promotes evapotranspiration, is an effective and permanent cover compatible with the site in a manner that does not compromise the underlying low permeability layer. The vegetative cover has been mowed annually since 1988 and is free from woody plants. Animal borrows and areas of erosion are not present as of October 24, 2006.

Based on comparison of the current 2006 survey and the 1987 survey, the grade of the landfill cover has not changed in any perceptible manner since the original closure and there are no depressions or areas of settlement in the cap. Since the material disposed is a mono-fill of the mineral gypsum future settlement or landfill gas production is not expected. The manner by which the existing cap at the CSL meets the general performance standards for landfill final cover systems (310CMR 19.112(1)(a-f)) is described below.

310CMR 19.112(1)(a). The CSL cover system, which includes a low permeability layer, a topsoil-vegetative support layer, a good, healthy vegetative layer, and positive grades, will continue to minimize percolation of water through the final cover system through inhibition of infiltration, promotion direct run-off and additional water loss through evapotranspiration.

310CMR 19.112(1)(b). The cover system whose grading plan included positive drainage and grass lined drainage swales, has promoted proper drainage of precipitation without any physical indication of soil loss or erosion since 1988. The cover system is expected to continue to promote proper drainage of precipitation.

310CMR 19.112(1)(c). The healthy vegetative cover and the final grading plan, has successfully prevented soil erosion of the final cover since the landfill was capped in 1988 and is expected to do so in the future.

310CMR 19.112(1)(d). The landfill is a mono-fill of gypsum, an inorganic material incapable of producing landfill gas. Therefore, the cover system at the CSL does not require gas venting layers or systems to control landfill gas or to maintain integrity of the other cover system components.

310CMR 19.112(1)(e). Since the landfill cover system has shown no signs of settlement, erosion or soil loss, the cover system will continue to ensure isolation the gypsum solids from the environment.

310CMR 19.112(1)(f). The gypsum minerals disposed at the CSL are uniform, geologically stable materials that are not subject to differential settling and subsidence. Therefore, the cover system performance standards will continue to be met in the future.

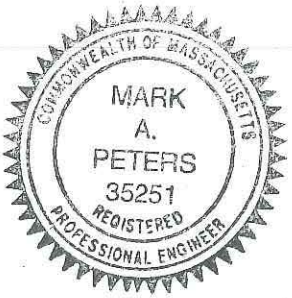
Based on this information, and assessment of current conditions, we certify that the CSL final cover meets the approved closure plan and the general performance requirements for landfill final cover systems.

If you have any questions, please feel free to contact Steve Morrow at (423)-336-4511.

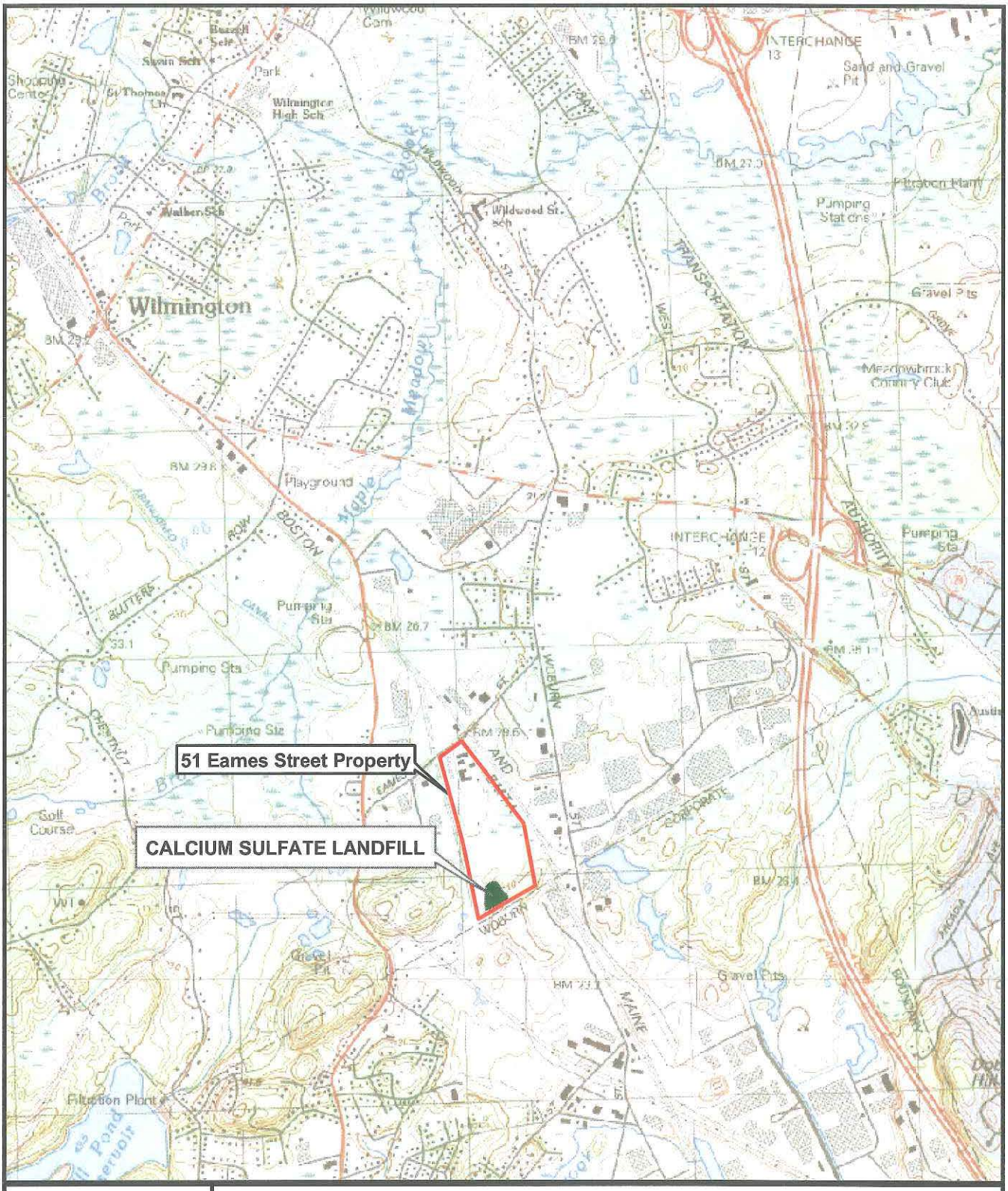
Sincerely,

Mark Peters, PE
Senior Engineer

Peter Thompson
Project Manager



Figures



Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs at http://www.mass.gov/mgis

Prepared by BRP | Checked by PHT

Figure 1
Site Location
Calcium Sulfate Landfill
Post Closure Monitoring Plan
51 Eames Street
Wilmington, Massachusetts
MACTEC, Inc.

Document: P:\Projects\olinwilm\Olin Wilmington CERCLA\GIS\MapDocuments\SiteMap.mxd PDF: P:\Projects\olinwilm\Olin Wilmington CERCLA\OEMI Tasks\Task 80.0 On-Going Activities\Task 80.14 Sulfate Lndfl Closure\Reports\PCMP\Figure

Legend

- CSL Groundwater Monitoring Wells
- Approximate CSL Boundary
- Olin Property Fence
- Wilmington / Woburn Town Line

MACTEC Engineering and Consulting
107 Audobon Road Suite 301
Wakefield, MA 01880

N

0 50 100 200 Feet

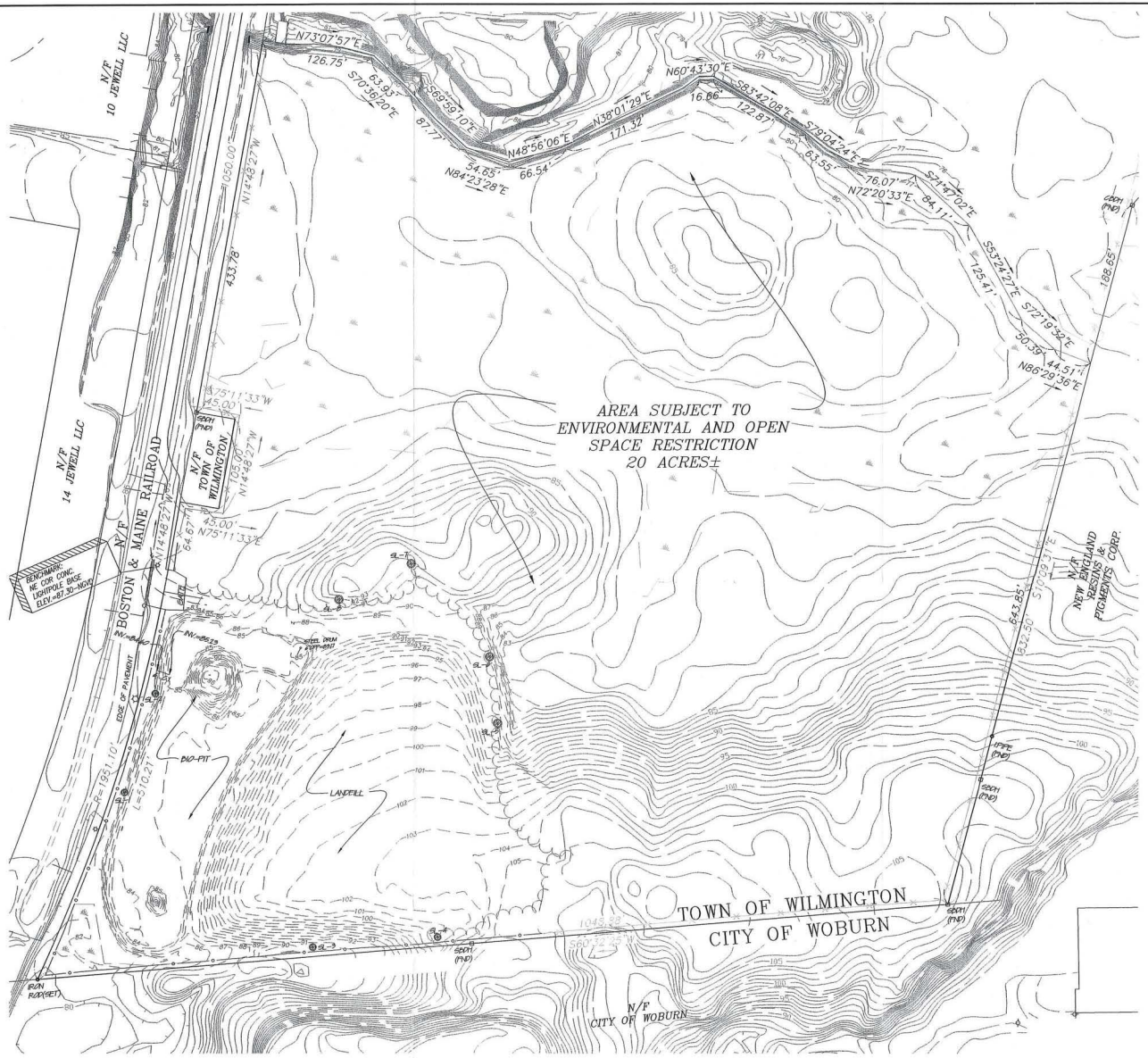
Figure 2
Calcium Sulfate Landfill
51 Eames Street
Wilmington, Massachusetts

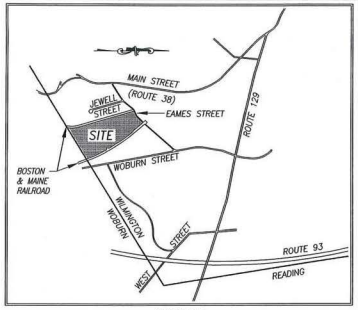
PROJ NO	6300030011/80.14	Prepared by PHT
DWG NO		Checked by MP

Document: P:\Projects\olinwilm\Olin Wilmington CERCLA\GIS\MapDocuments\Olin_2006_11x17_LS.mxd PDF: P:\Projects\olinwilm\Olin Wilmington CERCLA\OEMI Tasks\Task 80.0 On-Going Activities\Task 80.14 Sulfate Lndfl Closure\Reports\PCMP\Draft\Figures\Figure 2.pdf 12/13/2006 11:36 AM PHTHOMPSON

Attachment A

2006 Site Plan Survey





LOCUS MAP
NOT TO SCALE

LEGEND:

SYMBOLS & ABBREVIATIONS SHOWN ON THIS PLAN

EDGE OF WETLANDS	
DRAIN LINE	D
CHAINLINK FENCE	
EDGE OF WOODS	
LIGHT POLE	
MONITORING WELL	
CAST IRON	CI
POLYVINYL CHLORIDE (pipe)	PVC
INVERT ELEVATION	INV.=99.06
NOW OR FORMERLY	N/F

NOTES:

1. EXISTING CONDITIONS SHOWN IN THE LAND FILL AND BIO-PIT AREAS ON THIS PLAN ARE THE RESULT OF AN ON-THE-GROUND FIELD SURVEY CONDUCTED BY DANA. F. PERKINS, INC. DURING OCTOBER, 2006.
2. PROPERTY LINES SHOWN ARE THE RESULT OF AN ON-THE-GROUND FIELD SURVEY PERFORMED BY DANA F. PERKINS, INC. AND FROM AVAILABLE DEEDS AND PLANS OF RECORD.

60 0 30 60 120 240
(IN FEET)
1 inch = 60 ft.

COMMONWEALTH OF MASSACHUSETTS
GREGORY R. DEBORAH (No. 38574)
REGISTERED
PROFESSIONAL LAND SURVEYOR

EXISTING CONDITIONS
PLAN OF LAND
EXISTING LANDFILL
WILMINGTON, MASSACHUSETTS

SCALE: 1" = 60' | DATE: NOVEMBER 10, 2006

DANA F. PERKINS, inc.
Consulting Engineers & Land Surveyors
1049 EAST STREET
TEWKSBURY, MASSACHUSETTS 01876

PREPARED FOR:
OLIN CORPORATION
51 EAMES STREET
WILMINGTON, MASSACHUSETTS

JOB NO. 50272-LF | SHEET 1 OF 1

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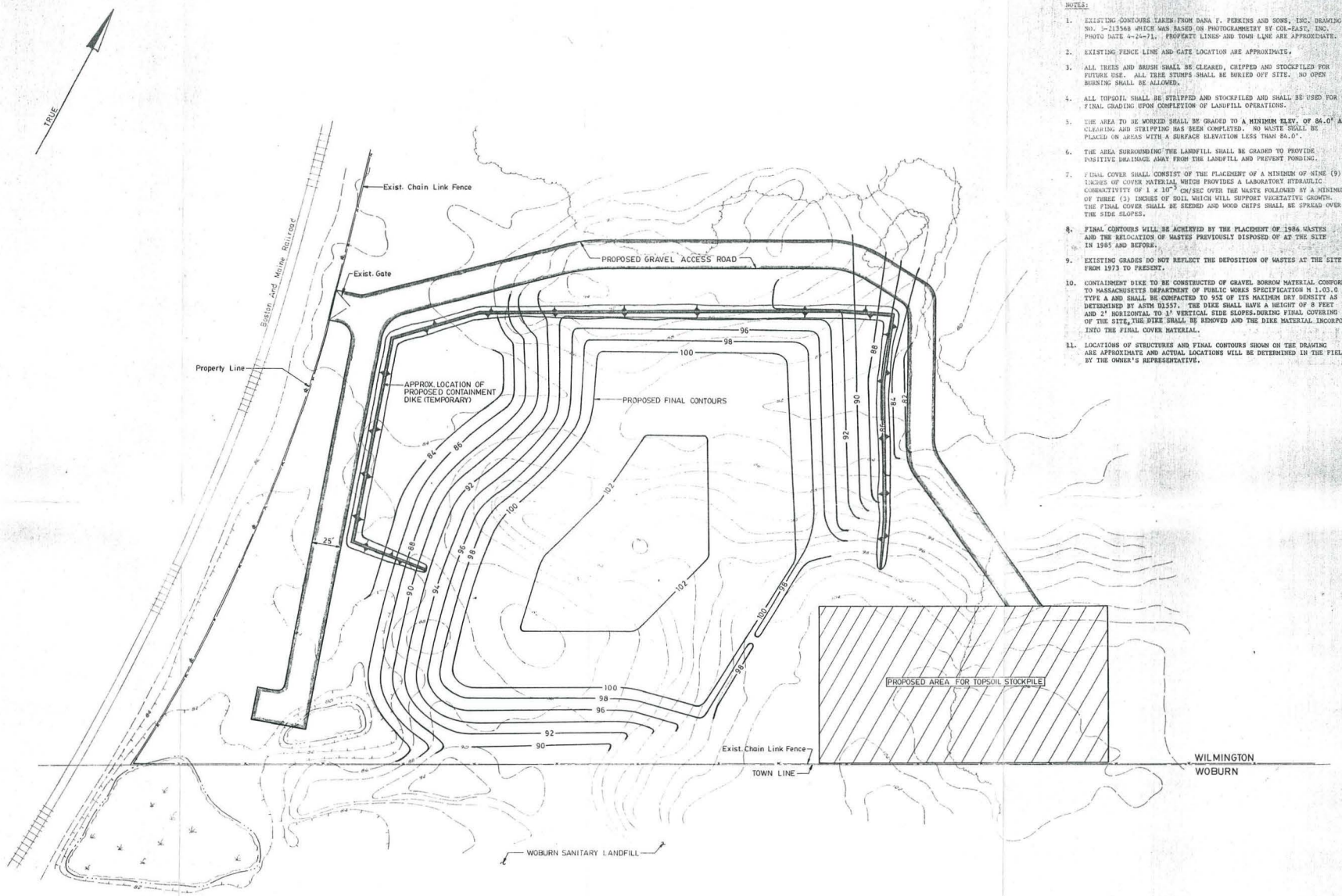
Attachment B

1986 Landfill Closure Conceptual Site Plan

1987 Site Plan Survey



NOTES:

1. EXISTING CONTOURS TAKEN FROM DANA F. PERKINS AND SONS, INC., DRAWING NO. 1-213568 WHICH WAS BASED ON PHOTOGRAMMETRY BY COL-EAST, INC. PHOTO DATE 4-24-71. PROPERTY LINES AND TOWN LINE ARE APPROXIMATE.
2. EXISTING FENCE LINE AND GATE LOCATION ARE APPROXIMATE.
3. ALL TREES AND BRUSH SHALL BE CLEARED, CHIPPED AND STOCKPILED FOR FUTURE USE. ALL TREE STUMPS SHALL BE BURIED OFF SITE. NO OPEN BURNING SHALL BE ALLOWED.
4. ALL TOPSOIL SHALL BE STRIPPED AND STOCKPILED AND SHALL BE USED FOR FINAL GRADING UPON COMPLETION OF LANDFILL OPERATIONS.
5. THE AREA TO BE WORKED SHALL BE GRADED TO A MINIMUM ELEV. OF 84.0' AFTER CLEARING AND STRIPPING HAS BEEN COMPLETED. NO WASTE SHALL BE PLACED ON AREAS WITH A SURFACE ELEVATION LESS THAN 84.0'.
6. THE AREA SURROUNDING THE LANDFILL SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE LANDFILL AND PREVENT PONDING.
7. FINAL COVER SHALL CONSIST OF THE PLACEMENT OF A MINIMUM OF NINE (9) INCHES OF COVER MATERIAL WHICH PROVIDES A LABORATORY HYDRAULIC CONDUCTIVITY OF 1×10^{-3} CM/SEC OVER THE WASTE FOLLOWED BY A MINIMUM OF THREE (3) INCHES OF SOIL WHICH WILL SUPPORT VEGETATIVE GROWTH. THE FINAL COVER SHALL BE SEEDED AND WOOD CHIPS SHALL BE SPREAD OVER THE SIDE SLOPES.
8. FINAL CONTOURS WILL BE ACHIEVED BY THE PLACEMENT OF 1986 WASTES AND THE RELOCATION OF WASTES PREVIOUSLY DISPOSED OF AT THE SITE IN 1985 AND BEFORE.
9. EXISTING GRADES DO NOT REFLECT THE DEPOSITION OF WASTES AT THE SITE FROM 1973 TO PRESENT.
10. CONTAINMENT DIKE TO BE CONSTRUCTED OF GRAVEL BORROW MATERIAL CONFORMING TO MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS SPECIFICATION M 1.03.0 TYPE A AND SHALL BE COMPACTED TO 95% OF ITS MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D1557. THE DIKE SHALL HAVE A HEIGHT OF 8 FEET AND 2' HORIZONTAL TO 1' VERTICAL SIDE SLOPES. DURING FINAL COVERING OF THE SITE, THE DIKE SHALL BE REMOVED AND THE DIKE MATERIAL INCORPORATED INTO THE FINAL COVER MATERIAL.
11. LOCATIONS OF STRUCTURES AND FINAL CONTOURS SHOWN ON THE DRAWING ARE APPROXIMATE AND ACTUAL LOCATIONS WILL BE DETERMINED IN THE FIELD BY THE OWNER'S REPRESENTATIVE.

A	10/6/86	FOR REGULATORY APPROVAL	

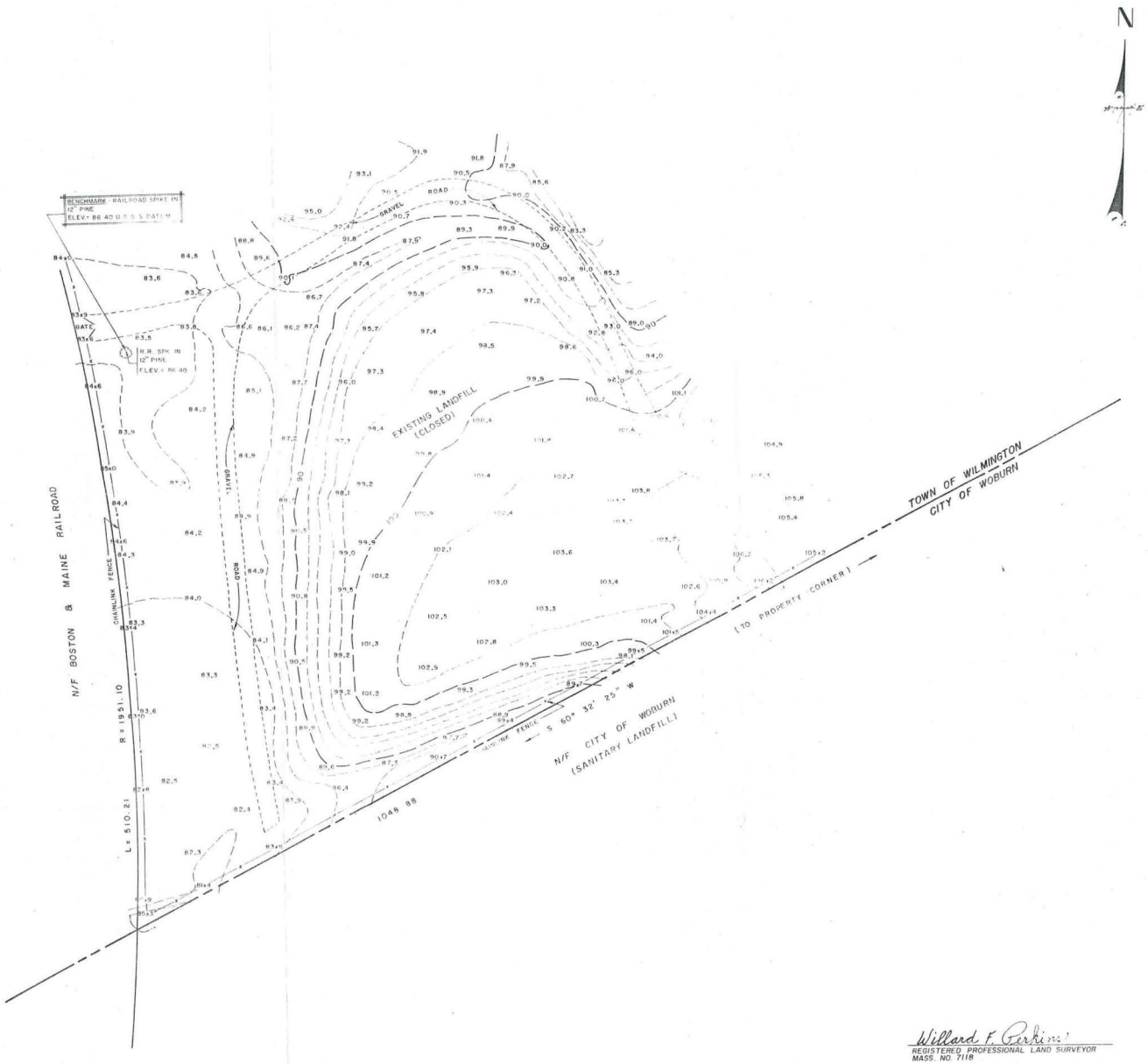
E.C. JORDAN CO.
CONSULTING ENGINEERS
OCT 8 1986

CLIENT
OLIN CHEMICAL CORPORATION
WILMINGTON, MASSACHUSETTS

DESIGN	S. Mitchell	9/86
DRAWN	R.D. CYR	9/86
CHKD	R Kuster	9/86
DEPT. HD	R Kuster	9/86
PROCESS	S. Mitchell	9/86
PROJ. MGR	A.K. Ohlweiler	9/86
CLIENT		

TITLE
LANDFILL CLOSURE
CONCEPTUAL SITE PLAN

PROJ. NO. 5121-00
DWG C-101
REV A



N

NOTES:

1.) PROPERTY LINE INFORMATION TAKEN FROM PLANS ENTITLED PLAN OF LAND IN WILMINGTON, MASS., SCALE: 1" = 60', DATED: JULY 9, 1980, SHEETS 1 & 2 OF 2 PREPARED BY DANA F. PERKINS & ASSOC., INC.

2.) ALL ELEVATIONS REFER TO U.S.G.S. DATUM.

3.) TOPOGRAPHIC INFORMATION SHOWN ON THIS PLAN IS THE RESULT OF AN ACTUAL FIELD SURVEY CONDUCTED BY DANA F. PERKINS & ASSOC. INC. ON OCTOBER 26 & NOVEMBER 6, 1987.

"TOPOGRAPHIC" PLAN OF LAND IN WILMINGTON, MASS.

PREPARED FOR

OLIN CORPORATION

Scale: 1" = 40' November 10, 1987

DANA F. PERKINS and ASSOC., INC.
CIVIL ENGINEERS and SURVEYORS
125 MAIN STREET READING, MASS.

40 0 40 80 120

Willard F. Perkins

REGISTERED PROFESSIONAL LAND SURVEYOR
MASS. NO. 7118

Attachment C

2006 CSL Cover System Inspection Report

CALCIUM SULFATE LANDFILL
COVER SYSTEM INSPECTION REPORT

51 Eames Street

Wilmington, Massachusetts

Prepared by:

MACTEC

MACTEC Engineering and Consulting, Inc.

511 Congress Street

Portland, Maine 04101

6300060011/ Task 80.14

November 2006

Introduction

An inspection of the Calcium Sulfate Landfill (CSL) cover system was completed on October 24, 2006 on behalf of Olin Corporation by MACTEC Engineering and Consulting, Inc (MACTEC). The CSL is located at 51 Eames Street in Wilmington, Massachusetts.

The purpose of the inspection was to confirm the thickness of the topsoil-vegetative support layer and collect soil samples for laboratory analysis of total organic matter. The topsoil layer was hand excavated at 30 locations to describe soil textural properties, and measure topsoil thickness (Figure 1). At fifteen of these locations a soil sample was collected for analysis of total organic matter by ASTM Method D2974 which measures the organic content by loss on ignition.

Visual Observations

The sample locations were established using a hand held global positioning satellite (GPS) receiver on a grid system at approximate 50 to 75 foot spacing foot spacing along five transect lines which varied from approximately 100 to 150 feet apart feet apart (Figure1). Figure 1 also depicts the approximate locations of low permeability soil samples collected in 1988, and the approximate areas where additional topsoil was placed in 1988. At all thirty locations observed, the topsoil layer was greater than 3-inches thick, and typically ranged in thickness from 5 to slightly greater than 7 inches. In appearance, the topsoil is a dark gray to black, organic sandy loam. The topsoil currently supports a healthy vegetative growth, consisting mainly of tall fescues and white clover. Areas which had been previously identified in 1988 as having thin topsoil cover were observed at a slightly higher frequency.

Sample Collection

A grab sample of the loamy topsoil was collected at 15 locations, placed in a four ounce glass jar, numbered, and preserved by cooling to 4 degrees centigrade. One field duplicate sample was collected for quality assurance/quality control purposes. These samples were submitted to Alpha Analytical Laboratories in Westborough, Massachusetts under chain of custody for analysis of total organic matter by ASTM Method D2974.

Results

Table C-1 presents a tabulation of the thickness of the topsoil at each of the 30 locations shown in Figure C-1. Due to the gradual nature of soil transitions, the measurements are recorded as greater than a minimum measured thickness at each location, which was typically about seven inches. This table also presents the analytical results for total organic matter for samples collected from 15 of these locations.

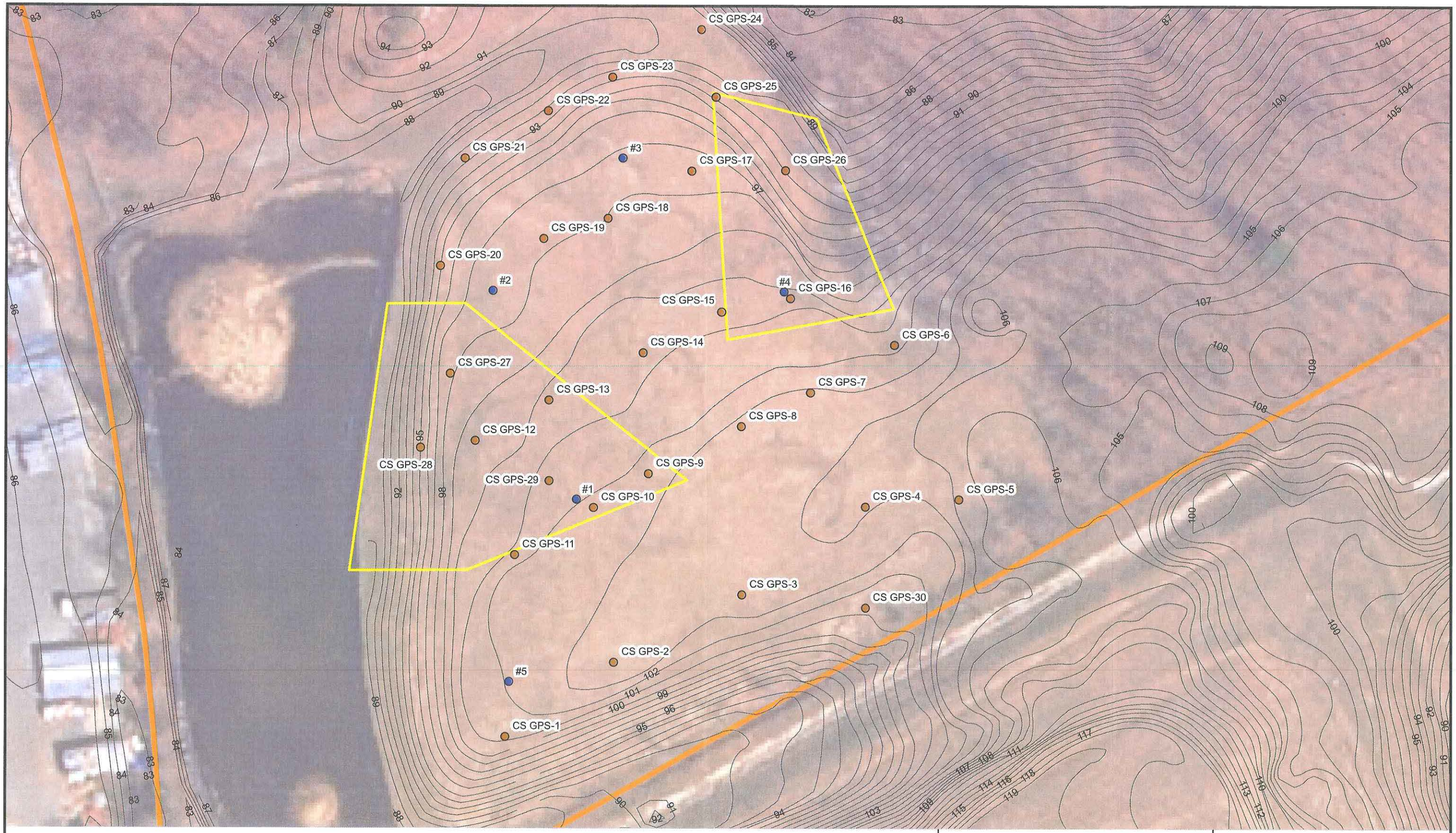
This data indicates that the topsoil thickness is greater than three inches at all locations observed. Total organic matter content of the topsoil ranged from 2.8% to 5.3% with an arithmetic average of 4.3%.

FIGURES AND TABLES

Table C-1
Calcium Sulfate Landfill
Topsoil-Vegetative Support Layer Thickness and Total Organic Matter
51 Eames Street
Wilmington, Massachussetts

Sample Location	Organic Layer Thickness	Total Organic Matter (%)	Solids %
CS-GPS 1	> 7"	5.1	78
CS-GPS-2	> 5"		
CS-GPS-3	> 7"	5.1	81
CS-GPS-4	> 7"		
CS-GPS-5	> 7"	4.2	82
CS-GPS-6	> 7"		
CS-GPS-7	> 7"	3.8	82
CS-GPS-8	> 7"		
CS-GPS-9	> 7"	3.9	84
CS-GPS-10	> 7"		
CS-GPS-11	> 7"	4	86
CS-GPS-12	> 7"		
CS-GPS-13	> 7"	4.6	81
CS-GPS-14	> 7"		
CS-GPS-15	> 7"	3.8	82
CS-GPS-16	> 7"		
CS-GPS-17	> 7"	3.7	82
CS-GPS-18	> 7"		
CS-GPS-19	> 7"	3.5	84
CS-GPS-20	> 7"		
CS-GPS-21	> 7"	2.8	85
CS-GPS-22	> 7"		
CS-GPS-23	> 7"	4.9	82
CS-GPS-24	> 7"		
CS-GPS-25	> 7"	5.3	77
CS-GPS-26	> 7"		
CS-GPS-27	> 7"	4.4	83
CS-GPS-28	> 7"		
CS-GPS-29	> 7"	5.3	85
CS-GPS-30	> 7"		

Notes:
Total Organic Matter by ASTM Method D2974
Alpha Analytical Laboratory
Date sampled : October 24, 2006
Date reported : November 3, 2006



Legend

- 1988 Final Cover Low Permeability Sample Location
- 2006 Soil Sample Location
- Approximate Boundary of Additional Topsoil Placed in 1988
- Site Boundary

MACTEC Engineering and Consulting
107 Audubon Road Suite 301
Wakefield, MA 01880

N

0 25 50 100 Feet

Figure C-1
Calcium Sulfate Landfill
Topsoil-Vegetative Support Layer Sample Locations
51 Eames Street
Wilmington, Massachusetts

PROJ NO	6300060011 / 80.14	Prepared by BJR
DWG NO		Checked by PT

Document: P:\W5-CHEM\OLIN\Wilmington\GIS\MapDocuments\Interim Response Work Plan\Olin_IRWP2.mxd PDF: P:\W5-CHEM\OLIN\Wilmington\GIS\Figures\CalciumSulfateLandfillSampleLocations.pdf 11/15/2006 10:15 AM bjroden

ANALYTICAL REPORT

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220 www.alphalab.com

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

CERTIFICATE OF ANALYSIS

Client: MACTEC Engineering

Address: 511 Congress Street
P.O. Box 7050
Portland, ME 04112-7050

Attn: Mr. Peter Thompson

Project Number:

Site: OLIN

Laboratory Job Number: L0615339

Date Received: 24-OCT-2006

Date Reported: 03-NOV-2006

Delivery Method: Client

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
L0615339-01	CS GPS-1	WILMINGTON
L0615339-02	CS GPS-3	WILMINGTON
L0615339-03	CS GPS-5	WILMINGTON
L0615339-04	CS GPS-7	WILMINGTON
L0615339-05	CS GPS-9	WILMINGTON
L0615339-06	CS GPS-11	WILMINGTON
L0615339-07	CS GPS-13	WILMINGTON
L0615339-08	CS GPS-29	WILMINGTON
L0615339-09	CS GPS-15	WILMINGTON
L0615339-10	CS GPS-19	WILMINGTON
L0615339-11	CS GPS-17	WILMINGTON
L0615339-12	CS GPS-21	WILMINGTON
L0615339-13	CS GPS-21DUP	WILMINGTON
L0615339-14	CS GPS-23	WILMINGTON
L0615339-15	CS GPS-25	WILMINGTON
L0615339-16	CS GPS-27	WILMINGTON

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized by: _____
Technical Director

ALPHA ANALYTICAL LABORATORIES
NARRATIVE REPORT

Laboratory Job Number: L0615339

The samples were received in accordance with the chain of custody and no significant deviations were encountered during preparation or analysis unless otherwise noted below.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-01
CS GPS-1
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 09:10
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	78	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	5.1	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-04
CS GPS-7
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 10:20
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	82	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	3.8	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-05
CS GPS-9
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 10:40
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	84	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	3.9	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-06
CS GPS-11
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 10:55
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	86	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	4.0	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-07
CS GPS-13
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 11:25
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	81	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	4.6	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-08
CS GPS-29
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 11:00
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	85	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	5.3	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-09
CS GPS-15
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 11:15
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	82	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	3.8	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-10
CS GPS-19
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 11:40
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	84	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	3.5	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number:	L0615339-11	**Date Collected:**	24-OCT-2006 11:55
	CS GPS-17	**Date Received :**	24-OCT-2006
Sample Matrix:	SOIL	**Date Reported :**	03-NOV-2006
Condition of Sample:	Satisfactory	**Field Prep:**	None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	82	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	3.7	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-12
CS GPS-21
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 12:20
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	85	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	2.8	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-13
CS GPS-21DUP
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 12:20
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	86	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	2.2	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-14
CS GPS-23
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 12:45
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	82	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	4.9	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-15
CS GPS-25
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 13:10
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	77	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	5.3	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA086 NH:200301-A CT:PH-0574 ME:MA086 RI:65 NY:11148 NJ:MA935 Army:USACE

Laboratory Sample Number: L0615339-16
CS GPS-27
Sample Matrix: SOIL

Date Collected: 24-OCT-2006 13:35
Date Received : 24-OCT-2006
Date Reported : 03-NOV-2006

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Solids, Total	83	%	0.10	30 2540G		1026 12:00	PD
Organic Matter, Total	4.4	%	0.10	12 D2974		1030 10:05	DW

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH DUPLICATE ANALYSIS

Laboratory Job Number: L0615339

Parameter	Value 1	Value 2	Units	RPD	RPD Limits
Solids, Total for sample(s) 01-16 (L0615339-01, WG258395-1)					
Solids, Total	78	80	%	3	20
Organic Matter, Total for sample(s) 01-16 (L0615339-01, WG258590-2)					
Organic Matter, Total	5.1	5.9	%	15	

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0615339

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-16 (WG258590-1)							
Organic Matter, Total	ND	%	0.10	12 D2974		1030 10:05	DW

REFERENCES

12. Annual Book of ASTM Standards. American Society for Testing and Materials.

30. Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

GLOSSARY OF TERMS AND SYMBOLS

REF	Reference number in which test method may be found.
METHOD	Method number by which analysis was performed.
ID	Initials of the analyst.
ND	Not detected in comparison to the reported detection limit.
NI	Not Ignitable.
ug/cart	Micrograms per Cartridge.

LIMITATION OF LIABILITIES

Alpha Analytical, Inc. performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical, Inc., shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical, Inc. be held liable for any incidental consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical, Inc.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding times and splitting of samples in the field.

CHAIN OF CUSTODY

PAGE ____ OF ____

Date Rec'd in Lab: 10/24

ALPHA Job #: L0615339

ALPHA WOODS HOLE LABS

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

RAYNHAM, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: MACTEC

Address: Congress St
Portland ME 04101

Phone: 207 775 5401

Fax:

Email:

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Olin

Project Location: Wilmington

Project #: 6320060011

Project Manager: Peter Thompson

ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: 11/07 Time:

Report Information - Data Deliverables

☐ FAX ☐ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program | Criteria

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTOCOLS

☐ Yes ☑ No Are MCP Analytical Methods Required?

☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: Total Organic Carbon 2974

SAMPLE HANDLING

Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TOC	Sample Specific Comments	TOTAL # BOTTLES
15339-01	CS GPS - 1	10 24 06	0910	Soil	TH	X		
-02	CS GPS - 3		0930		TH	X		
-03	CS GPS - 5		1005		TH	X		
-04	CS GPS - 7		1020		TH	X		
-05	CSGPS - 9		1040		TH	X		
-06	CSGPS - 11		1055		TH	X		
-07	CSGPS - 13		11:25		TH	X		
-08	CSGPS - 29		11:00		TH	X		
-09	CSGPS - 15		1115		TH	X		
-10	CSGPS - 19		1140		TH	X		

Container Type

Preservative ice

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP or CT RCP?

Relinquished By:	Date/Time	Received By:	Date/Time
Thomas Hanlon	10 24 01/1600	Kaelis Jacob	10/24 16:00

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms. See reverse side.

FORM NO: 01-01 (rev. 10-OCT-05)

CHAIN OF CUSTODY

PAGE _____ OF _____

Date Rec'd in Lab: 10/24

ALPHA Job #: L0615239

ALPHA WOODS HOLE LABS

WESTBORO, MA
TEL: 508-898-9220
FAX: 508-898-9193

RAYNHAM, MA
TEL: 508-822-9300
FAX: 508-822-3288

Client Information

Client: MACTEC

Address: Congress St
Portland MA 04101

Phone: 207 775 5401

Fax:

Email:

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Olin

Project Location: Wilmington

Project #: 6300600111

Project Manager: Peter Thompson

ALPHA Quote #:

Turn-Around Time

☑ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: 11/07 Time:

Other Project Specific Requirements/Comments/Detection Limits:

Report Information - Data Deliverables

☑ FAX ☐ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	Criteria

MA MCP PRESUMPTIVE CERTAINTY --- CT REASONABLE CONFIDENCE PROTOCOLS

☐ Yes ☑ No Are MCP Analytical Methods Required?

☐ Yes ☐ No Are CT RCP (Reasonable Confidence Protocols) Required?

ANALYSIS: TOTAL ORGANIC MATTER

SAMPLE HANDLING

Filtration
☐ Done
☑ Not needed
☐ Lab to do

Preservation
☐ Lab to do

(Please specify below)

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TOTAL ORGANIC MATTER	Sample Specific Comments
15339-11	CSGPS-17	10 24 06	1155	soil	TH	X	
-12	CSGPS-21		1220	soil	TH	X	
-13	CSGPS-21 DUP		1220		TH	X	
-14	CSGPS-23		1245		TH	X	
-15	CSGPS-25		1310		TH	X	
-16	CSGPS-27		1335		TH	X	

Container Type	
Preservative	

PLEASE ANSWER QUESTIONS ABOVE!

IS YOUR PROJECT MA MCP or CT RCP?

Relinquished By:	Date/Time	Received By:	Date/Time
Thomas Hayden	10 24 06 1620	Kaelis Jard	10/24/06 16:20

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms. See reverse side.

FORM NO: 01-01 (rev. 10-OCT-05)